Wetlands

Chapter Goals:
After completing this chapter, volunteers should be able to:

- Describe the identifying characteristics of a wetland.
- List some ways wetlands benefit people.
- Describe wildlife and plants in wetlands.
- Understand how wetlands can be damaged and the effects of damaged wetlands.

What are Wetlands?

Wetlands exist all over the United States. They are literally "wet lands," at least for part of each year. Some marshes, bogs, swamps, pond and lake margins are wet all year. Other wetlands, such as prairie potholes and desert seeps, are wet only part of the year. Wetlands can be fresh water, salt water, or a mix (called brackish). Most of the wetlands in the Rocky Mountain region are fresh water. Many of them dry up each year.

Whether permanent or seasonal, wetlands provide valuable habitat for insects, amphibians, reptiles, birds, some fish and mammals. Because of their abundant animal life, wetlands also attract scientists, hunters, birders, artists, and people who appreciate natural places.

Identifying Wetlands

Your senses can help identify wetlands. Check the soil: Is it damp to the touch? Does it glisten with liquid? Does the water soak through your shoe? Can you literally squeeze the water out? Do you see plants, such as sedges or cattails that are adapted for living in wet soil? Do you hear frogs or see salamanders?

Dragonfly on Cattail
Photo: © Jenifer Whipple 2003

What if that pothole or pond has already dried up for the season? How might you identify it as a wetland? Observe the area carefully. When mud dries is the surface cracked? Or is it damp beneath the surface? Look for signs of higher water such as marks on the shrubs, trees or rocks; grasses and twigs collected at the base of other plants; leaves coated with a thin layer of

sediment.

Similar protocols help environmental scientists and biologists determine the presence and extent of wetlands in a process called wetland delineation.

Hydric Soils

If you can squeeze a fist full of soil into a ball, you have soil with not much room for oxygen. That is bad for most plants. Oxygen is an essential part of their respiration. They absorb the oxygen from the soil through their roots.

Cracked soil often indicates that it was once wet soil.
Photo: © Carolyn Duckworth, 2014

These oxygen-starved (anaerobic) soils often smell like sulfur or rotten eggs due to the bacteria that thrive under anaerobic conditions. The dampness also causes chemical reactions in the elements of the soil. For example, iron will oxidize and mottle the soil with orange.

Scientists recognize two major types of wetland soils: organic and mineral. Organic soil has an obvious amount of decomposing plants. This kind of soil is often black or dark brown. Mineral soil contains few decomposing plants. Instead, it is comprised of materials such as clay, sand, or silt. Wetland mineral soils may be gray, greenish, or bluish-gray. They might also be mottled with orange or red streaks.

Scientists use color charts that key soil color with the amount of water in the soil (such as the Munsell Soil Color Charts). The U.S. Natural Resource Conservation Service (NRCS, formerly the Soil Conservation Service) also publishes a list of hydric soils http://soils.usda.gov/.

Soil content also determines the speed of draining. For example, water seeps through sandy soils faster than clay soils. Sand particles are large and irregularly shaped. They have more air pockets through which water can move. Clay particles are smaller. They can compress when wet. Their smaller air pockets fill more quickly and completely.

Wet Roots

Plants that live in wet soil must adapt to the lack of oxygen. Reeds and some sedges, such as those found in freshwater wetlands, have hollow structures that enable the little oxygen they obtain to travel quickly through the plant. Mangrove trees, found in saltwater (marine) wetlands, have a tangle of roots that are exposed periodically to the atmosphere as the tides ebb and flow. Cypress trees, which grow in freshwater swamps, have knobs or "knees" of root material that

emerge from the water. Scientists speculate that these knees absorb oxygen. The roots of floating plants, such as duckweed or lilies, dangle into water and absorb oxygen.

Wetlands plants must also be efficient at absorbing other nutrients such as nitrogen and phosphorus. For example, in wetlands, nitrogen is most often available as ammonia. Thus, many wetlands plants have become super-efficient absorbers of ammonia.

This small wetland plant can thrive even with wet roots.
Photo: © Carolyn Duckworth, 2004

Wetland Delineation

If a wetland exists on property slated for development, the developer will need to mark, or delineate, the boundaries of the wetland. To find out if a wetland has already been surveyed and designated as wetlands, a developer would contact the district office of the U.S. Army Corps of Engineers. If the area is not yet surveyed, the developer must hire wetlands experts (Society of Wetland Scientists; www.sws.org). They might begin by looking at aerial photographs or soil maps of the area (soil surveys available from the US Department of Agriculture; http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm). Then, they visit the site to evaluate the soils, plants, and hydrology.

The timing of those inspections can be critical. Many evaluators visit wetlands during the summer and fall because that's when wetland plants are most easily identified.

The delineation process should produce:

- Maps showing the size, location, shape and names of features.
- Data sheets listing soil, vegetation, and hydrological indicators.
- Vicinity map that identifies the study area.

Defining Wetlands

You would think the answer to "What is a wetland?" would be easy. Scientists, politicians, environmentalists, ranchers, farmers and developers have all been debating the definition of a wetland for over fifty years. Although many definitions of wetlands exist, the two definitions used by the U.S. Government agree that a wetland contains specific:

- Hydrology (amount and period of time that water is present)
- Hydrophytic vegetation (wetland plants adapted to wet soils)
- Hydric soils (soils low or absent in oxygen due to their saturation in water).

The U.S. Fish and Wildlife Service (FWS) say an area need only have one of these conditions to be considered a wetland. The U.S. Army Corps of Engineers (Corps) says an area must have all three conditions before it is considered a wetland. The Corps administers the wetlands provisions of the federal Clean Water Act. Therefore, its definition is the one most used by the federal, state, and local governments. The definition, as published in the 1987 Corps of Engineers *Wetlands Delineation Manual*, says:

> *"Wetlands are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."*

Within this definition there are many different types of wetlands, and many common names to describe these different wetlands.

Changing Attitudes

Our positive attitude about wetlands has developed mostly in the last half of the twentieth century. Prior to that time, many people in the United States considered wetlands to be dangerous, dark, damp, horrible places full of snakes that can kill you and mosquitoes that will spread diseases. Think of the name of a big wetland in southern Virginia: The Great Dismal Swamp. Today this is a National Wildlife Refuge revered by birders and botanists as a haven for wildlife and wild flora. But in the 1700s, it was described as "a horrible desert, the foul damps ascend without ceasing, corrupt the air and render it unfit for respiration."

With attitudes like this, it is no wonder that Americans, like many people around the world, dredged, drained, and filled in as many wetlands as possible, making these lands into farms, pastures, towns, and cities. Today, when you walk many of the streets of major cities such as Chicago, Boston, San Francisco, and Washington, D.C., you are walking upon filled-in wetlands.

Another Attitude

Native people of the Americas did not share this view of wetlands. Archeological evidence indicates that Mayans built raised fields in wetlands of Central America. The water would sweep up into the raised beds to moisten the crops. The Anishinabe (the tribe's preferred name, instead of Chippewa or Ojibway) live in a land of water, in and around Lake Superior and the other Great Lakes. They gather food of the wetlands, such as cranberries, and every fall they harvest wild rice, which can grow only in healthy, clean wetlands.

Chicago, IL is built on a wetland
Photo © Carolyn Duckworth

Scientists think that people began occupying the Columbia River Basin of Idaho and Washington more than 12,000 years ago. Ancestors of the

Nez Perce traveled to the Palouse region where they harvested camas bulbs that grow in seasonal wetlands of this fertile grassland. The Nez Perce, and many other tribes, continued this migration. Even today, they will travel to the camas meadows of the Columbia Basin for this staple. The Coeur d'Alene tribe considers the water potato so important that they celebrate it in a tribal holiday. Native people harvested other wetland plants such as alder, lovage, and horsetail. They also hunted animals of the wetlands, such as ducks and beaver.

(See appendix A for a list of wetland laws.)

Why Are Wetlands Important?

You can think of wetlands as acting like sponges, kidneys, and supermarkets, all at the same time.

Wetlands act like giant sponges, absorbing water during floods and storms. Instead of washing downstream and transporting sediment, water in wetlands slowly soaks into the ground to recharge aquifers and other ground water sources.

As water collects in wetlands, this ecosystem cleans the water. Sediments settle out as the water slows. The soil particles bind with pollutants. Some plants absorb the nutrients and toxins that would otherwise wash into our lakes, rivers, and coastal waters.

Some communities use this natural cleansing ability of wetlands to treat the wastewater and sewage. Such treatment occurs in urban areas of Pennsylvania and Wisconsin, plus smaller communities such as Moscow, Idaho. Wastewater treatment wetlands in Moscow, Idaho not only provide habitat for birds, but also polish the water before it flows down Paradise Creek.

Wetlands not only provide food and other functions. They are peaceful places where many people choose to recreate. In wetlands, people enjoy hunting, trapping, wildlife viewing, and many other activities.

Wetlands also serve as nurseries, cafeterias, and homes for fish and other aquatic species that we humans love to eat. Studies estimate that wetlands provide habitat, at some point, for at least two-thirds of the fish caught and sold in the United States.

In some wetlands, dense layers of rich organic material form as vegetation dies and is compressed. This resource, called “peat,” is mined to provide a soil conditioner for gardens and to provide fuel.

Economists consider all of these uses when they estimate the value of wetlands. One small Massachusetts wetland has been valued at $200,000. One acre of Louisiana coastal wetland might generate $80,000 in fish and other resources.

A wetland provides important services to our environment. When it disappears, so do those services. We lose vital flood protection, water cleansing, and food. All of the animals and plants that live in that habitat, for all or part of their lives, often have nowhere else to go. Frogs have no place to mate and lay eggs. Pintail ducks lose a watering and feeding stop on their long migrations. Aquatic insects die. All the animals that eat them must find food elsewhere.

Wetlands and People

Wetlands provide another important service for people. These bountiful habitats are popular places for recreation. Birders are the fastest growing group of outdoor enthusiasts in Idaho. They can often be found around wetlands watching waterfowl, songbirds, raptors, and shorebirds. Idaho's outdoor enthusiasts have good company. According to the U.S. Fish and Wildlife Service (USFWS), people who hunt, fish, canoe, and photograph wildlife rely on wetlands and contribute almost $60 billion to our national economy in a year.

Peace in the wetland
Photo: © USFWS 2004

Wetlands and the Environment

Wetlands cover less than ten percent of the earth's surface but are the source of almost one-quarter of the world's productivity. Saltwater wetlands provide nursery habitat for most of the fish and shellfish that we eat. As these habitats are destroyed, the ability of fish populations to replenish themselves is also destroyed. What effect will this have on our food supply in the future?

Wetlands are so productive because of the amount of vegetation they contain. Abundant plants constantly photosynthesize, converting carbon dioxide to oxygen and producing energy and food. Nutrients produced by the plants are distributed widely through floods, storms, and tides. The dead and dying plants (detritus) form the base of food webs. Protozoa, bacteria, fungi, and larvae consume the detritus; fish, worms, birds, and insects consume the detritus-consumers; etc. The dense vegetation of wetlands creates a natural water-treatment system that surpasses anything humans have created. As water enters a wetland, it slows. Sediment settles out and is

Emergent palustrine wetland on the Palouse, Idaho
Photo: © Penelope Morgan 2004

trapped by the wetland plants and their roots. The plants also absorb almost two-thirds of the nitrate and phosphorus commonly carried in storm water runoff and floods, especially from agricultural areas with their heavy loads of fertilizer. Bacteria in the water and soil also can neutralize wastes, including the body wastes of animals and humans.

The slowed, cleansed water of a wetland may pass into another waterway. Much of it percolates into the ground and recharges groundwater supplies. Such supplies provide a majority of the drinking water in many areas in the U.S. For example, one wetland in Massachusetts was found to recharge a shallow aquifer with more than 240 million gallons per month. In addition to slowing and cleansing water, in coastal areas the wetland's dense vegetation creates a tough buffer zone that can deflect waves and other heavy water action.

Wetland Plants and Animals

When you enter a wetlands habitat, you are entering an environment that supports thousands of plants, hundreds of birds, and almost all of the fish and shellfish that we consume. Permanent residents of wetlands in the Intermountain West include algae, bacteria, and other micro-organisms; animals such as the mosquito, dragonfly, and numerous aquatic insects, plus toads, the leopard frog, tiger salamander, pupfish, crayfish, beaver, muskrat; plants such as sedges and bulrushes, berry bushes, shrub willows, and cottonwoods. Seasonal residents include the American peregrine falcon, the whooping crane, ducks, geese, swans, numerous elk, bats, black bear, grizzly bear, bald eagle, osprey, trout, and salmon.

Rare Species and Wetlands

Nearly half of the threatened and endangered species in the United States rely directly or indirectly on wetlands for their survival. In Idaho, 49 species of rare plants and 29 species of rare animals depend on wetlands.

A Few of Idaho's Rare Wetland Species

- Bog-rosemary
- Bristly sedge
- Giant helleborine
- Bog willow
- Purple meadow rue
- Bull trout
- Northern leopard frog
- Coeur d'Alene salamander
- Northern bog lemming
- Brown bear
- Whooping crane

What does a riverside shrub have to do with a trout?
Plenty! For one thing, the overhanging limbs create shade beside the banks, a perfect place for a trout to rest during the heat of the day. Leaves also fall into the water and begin to decompose, providing food for the aquatic insects that trout eat.

Wetland Plants

Some wetland plants include alder, willow, cottonwood, cattails, sedges, rushes, and bulrushes. Others include beautiful purple camas, wild iris, and chokecherry. Many of these wetland plants provide food, shelter, perch sites, and nesting areas for wildlife. Have you ever walked under a willow and felt a cool mist in the air? Wetland plants keep the area cool with their shade. The water is transpired through their leaves.

Salmon and Wetlands

Spawning Chinook
Photo: © IDFG 2004

Riverine wetlands benefit young salmon directly, by providing them with shelter during the start of their lives. Riparian areas, or areas along streams or rivers, continue to benefit salmon indirectly throughout their lives, by helping to keep streams and rivers cool and free of sediment. The wetland vegetation shades the pools along the bank. It traps sediments during floods and binds the banks to prevent erosion. Sediment-free water is essential to salmon. For example, salmon eggs and alevin (hatchlings) depend on ample flows of clean water through gravel to bring them air and food. Sediment can smother the eggs and young salmon, and rob them of food. Sediment can also trap young salmon upstream preventing their migration to the ocean. Likewise, sediment can block adult salmon downstream preventing their return to spawning sites.

The wetlands of estuaries, such as at the mouth of the Columbia River, provide essential resting and feeding places for salmon. Young salmon spend at least a short time in these quiet waters before moving into the ocean. Fall Chinook salmon spend months there before beginning their adult journeys. Returning salmon also may rest briefly in the nutrient-rich waters of the estuaries, consuming one last massive meal before they journey to their spawning grounds.

Beaver and Their Dams

Beaver dams back up water on a stream, diversifying the habitat for other animals and plants. Beaver Lake, in Yellowstone National Park, is testimony to the industry of beavers and the ultimate result. This lake is now more meadow and mud than a body of water. However, you still can see the long dam built by beavers at least a century ago. Their dam slowed the flow of stream water and created a wetland.

The Intermountain West had thousands of beaver-created wetlands until trappers, supplying the fashion industry in the early 19th century, wiped out beaver. In Idaho, beaver were gone in less than ten years.

Beaver Dam
Photo © Carolyn Duckworth 2004

Today, beaver populations are steadily increasing. They are welcome residents in many natural areas. Some places in Idaho, beaver are doing so well that trapping is allowed again. The Idaho Department of Fish and Game plans these trapping seasons in order to manage beaver populations.

Because beaver have played such a large part in shaping, and even creating, wetlands in the past, biologists throughout the U.S. are using beaver to restore wetland habitats. The beaver are trapped and transplanted from healthy wetlands or urban areas to the damaged wetland. After some time, the beaver dams can re-create the natural hydrology of the area by slowing water and causing streams to overflow their banks. This is important for many species of wetland plants and animals that depend on flooding to deposit fresh soil and nutrients on the floodplain and to create many small pools of water where insects and amphibians may lay their eggs. Beaver may also have a revitalizing effect on some willows and red-osier dogwood. Maintaining beaver populations is a critical element in sustaining natural wetland complexes.

Types of Wetlands

One of the first questions to ask when you are trying to determine the type of wetland is "Is it fresh or salt water? Is it on the coast or inland? These answers will guide you to the five categories of wetlands recognized by most scientists and wetlands regulators: Marine (coastal, salt water), Estuarine (coastal, salt/freshwater mix), Riverine (associated with rivers and streams), Lacustrine (associated with lakes), and Palustrine (miscellaneous freshwater wetlands, generally shallow).

Scientists or regulators use these terms when discussing wetlands. These terms have specific definitions. Common names vary by region and country. The words "fen, bog, mire, peatland, and moor" all refer to freshwater wetlands that produce peat. Peat is the compressed layer of dead plants that resist decay in acidic wetland environments. These terms are also used

colloquially: "...especially that boggy part on the curve." Is this a real bog or just a wet place? However, if you said, "I have a wet area on my property. Is it some kind of palustrine wetland?" This question eliminates saltwater marshes, estuaries, and lakeside wetlands. It will help the expert determine what kind of plants, soils, and hydrology may be in the area.

Marine Wetlands

Saltwater wetlands along coasts. Water levels rise and fall with the daily tides. They can be subject to the force of waves, storms and ocean currents. Characteristics of marine wetlands vary with the level of tidal, wave, and current effects. Salt-tolerant plants, called halophytes, are dominant. Common halophytes include grasses such as Spartina species. Sub-tidal marine wetlands are submerged continuously. Intertidal marine wetlands are periodically exposed.

Estuarine Wetlands

Estuarine Wetland
Photo © U.S. Army Corps of Engineers.

Coastal wetlands within estuaries (zones where fresh and salt water mix). Estuarine wetlands usually have some access to oceans, with significant inflows of freshwater. Water levels rise and fall with the daily tides and can be subject to the force of waves and storms. Characteristics vary with the level of tides, waves and amount of salinity, which can vary with location and interactions with oceans and freshwater sources. Halophytes are dominant. Sub-tidal estuarine wetlands are submerged continuously. Intertidal estuarine wetlands are only periodically exposed. The wetlands of estuaries, such as at the mouth of the Columbia River, also provide essential resting and feeding places for salmon.

Riverine Wetlands

Riverine Wetland
Photo: © USFWS

Wetlands in the channels of rivers and streams. Riverine wetlands occur along streams, rivers, and irrigation canals throughout the United States. They are particularly noticeable in western states, such as Idaho, because they form ribbons of trees and shrubs in an otherwise arid landscape. You may have heard of these inland wetlands by their other name: “riparian” areas.

Riverine wetlands play an essential role in maintaining healthy streams and rivers. They

typically support dense stands of trees such as cottonwood and quaking aspen, shrubs such as mountain maple and red alder, and grasses. These plants help bind the soil of banks, protect the banks from erosion during floods, and trap additional sediment from floodwaters.

The plants also provide habitat for wildlife. Birds, from tiny warblers to majestic bald eagles, use riparian areas for cover from the weather, for breeding, resting, and foraging sites. Many species of salmon are dependent on healthy riverine wetlands and riparian areas for survival.

Riverine wetlands represent only about one percent of land in the Intermountain West. Scientists estimate that as much as eighty percent of the birds and other animals of the West depend on riparian habitats during all, or part, of their lives. Like other kinds of wetlands, riverine wetlands have been affected by human disturbance.

Lacustrine Wetlands

Wetlands around lakes and reservoirs. These freshwater wetlands form around the perimeter of lakes and reservoirs. They are larger than twenty acres or contain water depths of six feet. Like marine and estuarine wetlands, lacustrine wetlands are exposed to wave action.

Lacustrine Wetland
Photo: © Jennifer Whipple

Palustrine Wetlands

Isolated, inland wetlands not associated with lakes or reservoirs. Smaller and shallower than lacustrine wetlands, palustrine wetlands include marshes, wet meadows, bogs, potholes, and playas. Palustrine wetlands may be connected by surface or groundwater to rivers or lakes, or they may be isolated.

Palustrine Wetland
Photo: © U.S. Corps of Engineers

Forested palustrine wetlands occur in areas with abundant moisture, such as in the mountains. In the Rockies, look for them on the west side of watershed divides. Forest wetlands occur more frequently on the Idaho side of the Bitterroot Mountains receiving more precipitation than the Montana side.

Forested wetlands are easily missed. If you walk into a forest wetland, your senses will detect the difference. The air is often cooler, the ground

damp, if not soggy. Ferns and mosses may be abundant and other understory plants thicker. Look for tamarack, western red cedar, and western hemlock.

In Idaho, forest wetlands provide habitat for several species of salamanders, toads, and frogs. The Coeur d'Alene salamander only exists in moist forest areas of northern Idaho where rocky areas meet the wetlands. Open areas, such as sloughs, feature many kinds of grass-like plants such as sedges, bulrushes, cattails, and reeds. Other special types of isolated, palustrine wetlands include hot springs and vernal pools.

Hot springs, which are numerous in Idaho, provide warm wetland habitat that supports a variety of rare life. In no other wetlands will you find "thermophiles" (heat-loving microorganisms). These warm wetlands also harbor rare plants such as giant helleborine and Jones' primrose. In the winter, hot springs provide food and water for many animals.

Idaho's Animals and Wetlands

Fish: According to Gregg Servheen, a biologist with the Idaho Department of Fish and Game, "I guess you can say that all Idaho's fish species depend on wetlands. This includes bull trout, salmon, and steelhead, which are all threatened."

Birds: In Idaho's wetlands these include geese, yellow warblers, sandpipers, avocets, willets, plovers, herons, rails, ducks, red-winged blackbirds, owls, ducks, black terns, and boreal chickadees.

Vernal pools, also called ephemeral ponds, typically are wet in the spring after snowmelt or seasonally heavy rains. Their shallow, quickly disappearing waters cannot support fish. They provide essentially predator-free breeding areas for amphibians. Some scientists estimate that half of the amphibians in the U.S. breed only in these and other seasonal wetlands.

(See appendix B for common names of wetlands)

Wetlands in Idaho

"Race you to the river!" shouts a young girl as her horse trots across the hayfield. Her friend holds onto her hat with one hand and the reins with the other galloping fast to catch up. They plunge down the steep bench and slow their horses to a walk as they enter the cool shade of cottonwoods. Reining their horses to a stop, the two girls listen: A symphony of insects and birds call and sing throughout the leaves of the trees and shrubs. They dismount to examine two sets of tracks, deer and bobcat, crossing the soft, moist soil. Then, they quietly approach another friend, who is fly-casting out into the river. It is just another summer afternoon in central Idaho, brought to you by wetlands.

Idaho wetlands may be obvious habitats. There are freshwater marshes or lake edges. More subtle habitats such as winding miles of riverside wetlands can be found. Sometimes, there are

hard-to-find habitats, such as ephemeral ponds of forests, prairies, and glaciated valleys. They are not always freshwater habitats. You will find saline wetlands in undrained depressions and areas receiving irrigation runoff. This vast region, with its varied terrain-rivers, valleys, mountains, and grassland-provides a living laboratory of inland wetlands. We will focus on the two types of inland wetland habitats common in this region: riverine and palustrine.

Inland freshwater wetlands differ from coastal/marine wetlands in water chemistry and dynamics. They are not subject to tidal fluctuations or to extreme wave action of ocean storms. Thus, their vegetation can be more stable, such as shrubs, or less anchored, such as floating plants that have no roots in the sediment. You will often find mats of duckweed on freshwater wetlands. These plants float on the surface. Their roots extend into the water but not down to the sediment.

Freshwater wetlands play an essential role in the availability of water in the arid Intermountain West. By slowing floodwaters or capturing snowmelt each season; inland wetlands retain the water, which then can seep into the ground to recharge aquifers and other sources of groundwater. In addition, the wetlands vegetation and sediment filter out many pollutants from the water.

Some inland wetlands, such as sloughs associated with rivers, may appear the same each year. The relatively stable climate of mountain valleys allows vegetation in these wetlands to stabilize and reappear year after year.

Other inland wetlands, such as prairie potholes, may seem to disappear for most of a decade, only to reappear during wet years. Look for more subtle clues to identify these types of wetlands. The dryness of the soil or the present vegetation can be deceptive. This type of wetland is found throughout the Palouse in North Idaho.

Losing our Wetlands

A harried homeowner stands on her deck, her shoes damp and anger on her face. She is yelling at her companion. She has to shout to be heard above the rush of the river in spring flood. "The second cottonwood went down last night. Now, the river is eating away at the third. If that one goes, I think we may lose the entire backyard. The real estate agent swore our land would be safe, but a fourth of it is gone!"

Photo: © US Corps of Engineers

If you understand how riverine wetlands protect us from flooding. You know that we have lost so much of this vital habitat. You would think that no one would buy a house next to a big river. People do it every day, in every state, in the country. We cannot seem to help ourselves. We love water. We love vegetation. We love birds, mammals, and fish. As the woman above is discovering, our love of this riverside land could be our undoing.
Such a revelation is ironic when you consider that wetland destruction historically has been caused by our hatred of these same habitats. After all, they bred mosquitoes, were impossible to build upon or plow. So why not get rid of them? We have destroyed millions upon millions of acres of wetlands everywhere from Maine to Florida to the west coast.

How Much Have We Lost?

In a few hundred years of settlement, the United States has lost more than half of its original wetlands, from an estimated 220 million acres to less than 110 million acres, in the contiguous states. More than half of Idaho's wetlands disappeared by 1980. Ninety percent of the state's low-elevation wetlands are gone, converted to agriculture or urban areas, destroyed by channelizing of streams, polluted by humans, and invaded by exotic plants. These changes have decreased fish reproduction and reduced populations of the spotted frog and western toad.

Photo: © US Corps of Engineers

Currently, the United States loses more than 70,000 acres of wetlands every year. This pace probably will not slow. Within the next few decades, more than half the population of this country will live within fifty miles of our coasts. Urban development in this region has already accounted for almost half of the coastal wetlands destruction in the last decade of the twentieth century. If we keep moving to and building in this region, how much longer will the remaining wetlands survive? The same conundrum faces homeowners of the Intermountain West. Can we keep from loving our favorite places to death?

How Are Wetlands Damaged?

Draining, dredging, building dikes, dumping pollutants, mining for sand and gravel, ditching, and building roads are just a few of the many direct ways we damage or destroy wetlands. The indirect methods, wakes of motorboats, urban runoff, and global climate change. It is a wonder there are any wetlands left.

For hundreds of years, agriculture has been the chief destroyer of wetlands. If a field were too wet in the spring, farmers would dig a ditch to drain off the water. When the country and the world demanded more grain, the federal government paid people to drain more wetlands. When family farmers struggle to make their mortgage each month, it is hard to ask them not to plow every square inch of ground.

Urban expansion gobbles up more large chunks of wetlands. Vast acres of marshes in the San Francisco Bay, Chesapeake Bay, New York Harbor and other coastal areas were dredged or filled in the twentieth century to make way for freeways, airports, industrial sites, business parks, and thousands of homes. Those are the obvious losses. Most people barely notice the millions of small wetlands lost to bulldozers. These small wetlands, which often last only a few months each year, are vital purifiers of surface water, rechargers of groundwater, and providers of habitat for wildlife.

In the western United States, riparian areas along riverine wetlands face continued destruction from several sources. According to some researchers, livestock grazing has damaged hundreds of thousands of acres of riverine wetlands. Livestock not only consume the vegetation. They tend to remain in the same area for an extended period. Their movements to and from riversides create gullies and undermine the banks. Our construction efforts, whether building roads and bridges or homes and businesses, can also affect streamside habitats by compacting soil, ripping up vegetation, and accidentally carrying in seeds of non-native or noxious plants, such as knapweed.

Threats to Idaho's Wetlands

Idaho has lost more than half of its wetlands. They continue to be lost today. How does this happen?

- Road and highway fill and construction.
- Development, Irrigation and other water use.
- Converting grasslands to agriculture in the Palouse region.
- Hardrock mining, which can lower water tables, drying up wetlands that are fed by groundwater.
- Sand and gravel mining, placer and dredge mining can destroy habitat along the bottoms and banks of rivers.
- Channelizing streams and rivers, such as the Portneuf River near Pocatello, increases water velocity, erosion, and flooding.
- Industrial-scale timber harvesting can damage riversides when road construction and tree removal of from streamside areas and steep hillsides above streams cause runoff and sediment loads to increase.

What Happens When Wetlands Disappear?

There are flooded basements in the spring. Entire downtowns are inundated. Millions of pounds of soil are washed downstream, destroying

farmland, fisheries, and food for wildlife. Whether it is localized flooding or catastrophes, such as the Midwestern floods of 1993, the entire United States is at risk from increased flooding due to our destruction of wetlands.

Photo: © US Army Corp of Engineers

The U.S. Army Corps of Engineers has studied the causes of flooding and advocates wetlands protection as the most cost effective way to prevent flooding. Florida and Louisiana were both hit directly by Hurricane Andrew in 1992. Florida suffered ten times the destruction. What was the difference? Louisiana had retained more of its coastal wetlands.

Small-scale wetlands destruction can also have far-reaching effects. As they disappear, so too do their abilities to recharge groundwater, collect sediment, and trap pollutants. Isolated wetlands often serve as crucial habitat for small populations of rare birds, insects, and amphibians. Only a few whooping cranes nest at Gray's Lake National Wildlife Refuge in eastern Idaho. If irrigation drew down the water table enough to dry up even small portions of this wetland, the crane's nesting success could be threatened by increased predator access or other problems associated with diminished wetland.

Agriculture and urbanization have devastated the wetlands of California's Central Valley. In previous centuries, this huge valley's wetlands supported 40 million waterfowl. Today, it supports only 8 million waterfowl, with simultaneous reductions in recreation, hunting, and fishing associated with this habitat.

The Caddis fly is an aquatic invertebrate.

The impact of wetland destruction occurs far beyond what we can see. Aquatic invertebrates (picture to right is a Caddis fly) are primary consumers in many aquatic ecosystems. They consume algae and other organic matter, and subsequently become food for other types of invertebrates and vertebrates throughout the food web. Some species are only found in a few springs or streams. Their loss could ripple far beyond their isolated wetlands.

The loss of small, seemingly insignificant, wetlands causes problems no matter where they

are. In urban areas, many construction crews ignore or are unaware of seasonal stream channels and ponds. They fill the depression in the ground without considering the cumulative impact of this landscape alteration. Subsequent home or business owners will have to deal with the flash floods, wet basements, and inundated parking lots.

Downstream, water quality begins to suffer and affects life from the microorganism to the megafauna. What are we to do? Should we learn to live with more floods, less water, or fewer fish? Maybe we should not. Next, find out about people trying to protect and restore wetlands.

Protecting Wetlands

Suppose you live near a wetland surrounded by land slated for development. What should be done to protect this wetland? Bring in wetlands experts to delineate and define the wetland. Identify adjacent landowners and other interested people. Invite them to tour the site and meet to discuss a plan. Establish goals, which should include:

- Establishing protection for the wetland.
- Preventing any further damage.
- Repairing as much damage as possible.
- Educating the public about the presence of the wetland and how they can help.

Work with private landowners, local governments, and area conservation groups to evaluate and choose from a number of protection options, including:

- **Conservation easement:** This voluntary, legal agreement, usually between a private landowner and an agency or nonprofit organization, such as a land trust, restricts the amount and type of development and protects natural features, such as wetlands. The landowner can sell or give the property to heirs. All future owners must comply with the easement. Easements vary from site to site.
- **Lease:** You can agree to rent the wetland to a government agency or nonprofit organization for a specific period of time.
- **Donation:** The landowner gives the property to a nonprofit organization and receives a generous tax deduction and the assurance that the land will be maintained as a wetland.
- **Sale:** You can sell the land to a nonprofit organization that will either maintain the land or turn it over to an appropriate government agency.

The Natural Resources Conservation Service (NRCS) administers the following programs:

- **Conservation Reserve Program:** Through rental payments and cost sharing, the federal government helps landowners develop conservation plantings and other habitat enhancements on and around agricultural land.
- **Wetlands Reserve Program:** The federal government purchases a conservation easement, which limits future use of the land and allows continued agricultural practices while setting aside and restoring valuable wildlife habitat.
- **Wildlife Habitat Incentives Program:** This cost-sharing program enables landowners to create and improve wildlife habitat in collaboration with the NRCS. For more information: www.nrcs.usda.gov.

Protection Success

Rancher: On Flat Ranch, on the Henry's Fork of the Snake River in eastern Idaho, you are as likely to see sandhill cranes as you are cows, birders and anglers as you are to see cowboys. This 1600-acre ranch keeps cows moving in a grazing rotation that protects the land. The riparian areas are being re-vegetated with willows and other wetlands plants. Each year more visitors come to enjoy the recreation provided on this ranch, owned by the Nature Conservancy.

Sandhill Cranes
Photo: © William H. Mullins

Partnership: Nonprofit groups and government agencies formed a partnership to protect one of Idaho's last high desert, spring-fed wetlands. Chilly Slough, in the Big Lost River Valley, provides habitat for rare plants and more than 134 bird species. Its 1,000 acres are maintained by The Nature Conservancy, Ducks Unlimited, the Rocky Mountain Elk Foundation, Idaho Department of Fish and Game, U.S. Fish and Wildlife Service, and the U.S. Bureau of Land Management.

School group: Fifth graders from Wendell Elementary, in Wendell, Idaho, have planted marsh grasses to restore an eroded wetland and help a larger wetland mitigation project that will use wetlands to clean irrigation water.

Wetland Restoration

Can we put back what we have taken away? Some people say yes. We can restore wetlands. Other people say no. Sometimes, simply stopping or changing the damaging disturbance will allow the stream or wetland to restore itself. When livestock grazing is removed, wetland vegetation often returns, as is seen with this project that fenced out sheep from Big Mud Creek. When the disturbance has been long-term or certain functions such as flood control or clean water are desired, we speed up the rehabilitation process by doing restoration projects.

It is certainly possible to restore an area so that it looks like a wetland. Plants will grow again. Ducks will stop by, fish and frogs may return. What looks like a wetland may not act like a wetland, at least not for many decades. These ecosystems are so complex and provide such a variety of essential functions to the rest of the environment that they cannot possibly be recreated completely. Even so, restored wetlands provide valuable habitat functions for many plant and animal species. As long as we do not fool ourselves into thinking we have rebuilt the entire function of a wetland overnight, restoration has a role to play in wetlands preservation.

"Restoration" is a general term used for projects that have many different goals. Some goals of restoration projects may include:

Restored Wetland at the University of Idaho
Photo: © Penelope Morgan

- Stabilizing stream banks to stop erosion.
- Creating habitat for fish, birds, amphibians, or other wildlife.
- Reconnecting incised streams with their floodplains.
- Bringing back native vegetation.
- Controlling floods.
- Improving water quality by trapping sediment and filtering runoff with riparian buffer strips.
- Increasing infiltration or surface water to ground water through wetlands and riparian areas.
- Preserving rare species.
- Mimicking formal natural conditions.
- Cleaning water with wetlands.
- Educating and bring communities together.
- Beautifying streams and wetlands.
- Providing sites for ecological research.

Appendix A: Wetland Laws

Clean Water Act (CWA) of 1972, Section 404
Requires permits before disposing dredge or fill materials into waters of the United States; protects adjacent wetlands.

National Environmental Policy Act (NEPA)
Requires federal assessment of impacts to the environment, including wetlands, of any projects proposed by federal agencies. It requires annual report to Congress on the status of the environment.

Executive Order 11990 (Protection of Wetlands)
Issued by President Carter, in 1977; forbids federal government construction in wetlands unless no other alternative exists; if construction must occur, it must limit harm to the wetland. Also requires agencies to have the public review its plans for any new construction in wetlands.

Executive Order 11988 (Protection of Floodplains)
Issued by President Carter requires federal agencies to avoid activities in floodplains. Also provides incentives to communities that conserve floodplains.

Food Securities Act of 1985 (Swampbuster)
Removes incentives to convert wetlands to cropland.

Coastal Zone Management Act
Establishes importance of preservation, protection, and restoration of coastal lands, including those of the Great Lakes.

Fish and Wildlife Coordination Act
Requires all federal agencies to consult with the U.S. Fish and Wildlife Service on wildlife impacts of any projects that involve water.

North American Wetlands Conservation Act
Helps fund wetland conservation projects in the U.S., Canada, and Mexico with the North American Wetlands Conservation Fund.

Jimmy Carter Saved Wetlands

On May 24, 1977, President Jimmy Carter issued one of the most environmentally important executive orders, Number 11990, "Protection of Wetlands." This executive order forbids federal government construction in wetlands unless no alternative exists; if construction must occur, it must limit harm to the wetland. The order also required agencies to have the public review its plans for any new construction in wetlands. Number 11990 spawned numerous new laws and policies, and its influence continues today.

Coastal Wetlands Planning, Protection, and Restoration Act
Funds grants to states to purchase and protect coastal wetlands.

Water Resources Development Act of 1999
Authorizes $200 million for wetlands restoration for flood control.

1990 Food, Agriculture, Conservation, and Trade Act
Establishes Wetland Reserve Program (WRP) to restore wetlands that were converted to cropland before 1985.

Appendix B: Common Names for Wetlands

Bog
Acidic wetland with no appreciable inflow or outflow of water. Supports acid-loving mosses such as sphagnum, plus some shrubs and trees. Dead plants accumulate and are compressed, forming peat.

Bottomland
Usually forested lowland in the floodplains of streams and rivers. Also called bottomland hardwood forests.

Fen
Similar to bog (some scientists say that bog and fen are the same). Receives some water from surrounding mineral soils and supports marsh like plants, which form peat as they die and are compressed. In northern Europe, they call fens and bogs "mires."

Marsh
Fresh, brackish, or saltwater lands along rivers, creeks, ponds, lakes, and coasts; often or always flooded. Supports plants that grow up out of the water (emergent vegetation).

Muskeg
Common in northern regions such as Alaska and Canada. An expanse of very wet peatland or bog. Also called subarctic peatland.

Peatland
Any wetland that forms peat, including bog, fen, mire, and muskeg.

Playa Lake
Desert or Great Basin seasonal wetlands formed in depressions; usually dry by summer. Plants are marsh like.

Pothole
Depressions created by the scraping action of glacier. Provides essential nesting and migratory rest stops for birds. Found in the grasslands of the mid-west, as well as in other glaciated landscapes.

Riparian
Wetlands along rivers or streams.

Slough
Freshwater wetlands including swamps and shallow lakes.

Swamp
Any freshwater wetland supporting trees and shrubs. Often found along rivers, slow streams, or in depressions.

Wet Meadow
Grassy area with saturated soils but not standing water.

For other definitions of wetlands, go to:
http://water.epa.gov/lawsregs/guidance/wetlands/definitions.cfm

To explore different types of wetlands, go to:
http://water.epa.gov/type/wetlands/types_index.cfm

This chapter was created from the wetlands information pages on the Idaho Department of Fish and Game website, with permission.

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